

CLAIMS

We claim:

1. A refrigerator with clear ice making capability, comprising:
a cabinet defining an interior refrigerator chamber and an interior ice maker chamber isolated from the refrigerator chamber by a partition wall;
a clear ice maker mechanism disposed in the ice maker chamber and
5 including an evaporator plate defining a plurality of pockets over which water cascades and in which clear ice pieces are formed;
a refrigeration system including an ice maker evaporator disposed in the ice maker chamber adjacent the evaporator plate and a refrigerator evaporator disposed in the refrigerator chamber, the evaporators being coupled to a
10 compressor receiving return refrigerant from the evaporators and to a condenser coupled to the compressor.
2. The clear ice making refrigerator of claim 1, wherein the evaporators are connected in series.
3. The clear ice making refrigerator of claim 2, wherein the refrigerator evaporator receives refrigerant passing through the ice maker evaporator.
4. The clear ice making refrigerator of claim 3, wherein the refrigeration system further includes a refrigerator valve controlling flow of refrigerant from the ice maker evaporator to the refrigerator evaporator.
5. The clear ice making refrigerator of claim 4, wherein the refrigeration system further includes a bypass valve controlling flow of refrigerant from the ice maker to the compressor when the primary valve is closed.

6. The clear ice making refrigerator of claim 5, wherein the primary and bypass valves are controlled so that during operation of the refrigerator at least one of the valves is open without both of the valves being open or closed concurrently.

7. The clear ice making refrigerator of claim 3, wherein the refrigeration system further includes a bypass valve disposed between an outlet side of the compressor and the inlet side of the ice maker evaporator so that when open hot refrigerant is routed to the ice maker evaporator.

8. The clear ice making refrigerator of claim 3, wherein the refrigeration system further includes a capillary tube coupling an outlet side of the condenser to an inlet side of the ice maker evaporator.

9. The clear ice making refrigerator of claim 8, wherein the refrigeration system further includes a drier at the outlet side of the condenser and an accumulator coupled between an outlet side of the refrigerator evaporator and an inlet side of the compressor.

10. The clear ice making refrigerator of claim 3, wherein the refrigeration system further includes a water system including:

a water sump mounted in the ice maker chamber beneath the ice maker evaporator plate;

5 a water pump disposed in the sump to circulate water from the sump back to the evaporator plate; and

an overflow mechanism coupling the sump to a drain.

11. The clear ice making refrigerator of claim 10, wherein the ice maker mechanism includes a water distributor disposed above the evaporator plate distributing water over the plurality of pockets of the evaporator plate.

12. The clear ice making refrigerator of claim 11, wherein the distributor receives water from a water tube.

13. The clear ice making refrigerator of claim 12, wherein the water tube is mounted to the distributor by a tube retainer.

14. The clear ice making refrigerator of claim 13, wherein the tube retainer is located at a center of the distributor and has an opening receiving the water tube and an inverted partial cup section mating with a partial cup section of the distributor.

15. The clear ice making refrigerator of claim 10, wherein the overflow mechanism includes a drain pump and an overflow collector having a first float operating a switch to activate the drain pump.

16. The clear ice making refrigerator of claim 15, wherein the overflow collector includes a second float disposed vertically above the first float used to operate a second switch for signaling the controller to shut down the ice maker mechanism until the second float has returned to a normal position.

17. The clear ice making refrigerator of claim 16, wherein an indicator light is provided which is activated by the second float.

18. The clear ice making refrigerator of claim 17, wherein the indicator light stays on until power is removed to the refrigerator.

19. The clear ice making refrigerator of claim 1, wherein the cabinet has a front opening leading to the ice maker chamber and the refrigerator chamber that is closed by a door hinged to the cabinet along one side having a seal that when the door is closed extends along walls of the cabinet defining the front opening and along the partition wall dividing the refrigerator chamber from the ice maker chamber.

20. The clear ice making refrigerator of claim 19, a cross member of the seal extends between parallel segments of the seal at an intermediate location between end segments of the seal selected to seal an opening to an insulated body in the ice section when the door is closed.

21. The ice making refrigerator of claim 1, wherein the evaporator plate has a plurality of spaced vertical members and a plurality of spaced horizontal members intersecting the vertical members at right angles to define the pockets.

22. The ice making refrigerator of claim 21, wherein the horizontal members slope downwardly from a rear edge to a front edge at an oblique angle.

23. A combination refrigerator and ice maker unit having a cabinet defining an interior refrigerator chamber and an interior ice maker chamber in which is disposed a clear ice maker having an evaporator plate in which ice cubes are formed, the unit has an electronically controlled refrigeration system, comprising:

an ice maker evaporator disposed in the ice maker chamber adjacent the evaporator plate;

a refrigerator evaporator disposed in the refrigerator chamber;

a compressor disposed in the cabinet external to the ice maker and refrigerator chambers receiving refrigerant from one of the evaporators via a suction tube;

a condenser disposed in the cabinet external to the ice maker and refrigerator chambers receiving compressed refrigerant from the compressor via a discharge tube and being coupled to the ice maker evaporator via a capillary tube;

a refrigerator valve disposed in a line between an outlet side of the ice maker evaporator and an inlet side of the refrigerator evaporator so that when open the refrigerator evaporator is in fluid communication with the ice maker evaporator and when closed the refrigerator evaporator is closed from the ice maker evaporator; and

a refrigerator bypass valve disposed in a line between outlet sides of the evaporators and an inlet side of the compressor so that when open the ice maker is in fluid communication with the compressor and when closed the refrigerator evaporator is in fluid communication with the compressor;

wherein one of the refrigerator valve and refrigerator bypass valve is open during operation of the refrigerator without both being open concurrently such that when the refrigerator bypass valve is open no refrigerant passes from the ice maker evaporator to the refrigerator evaporator.

24. The combination unit of claim 23, wherein the refrigeration system further includes a hot gas bypass valve disposed in a line joining the discharge tube to an inlet of the ice maker evaporator such that when closed an outlet side of the compressor is in fluid communication with an inlet side of the condenser and when open the outlet side of the compressor is in fluid communication with an inlet side of the ice maker evaporator such that no refrigerant passes from the compressor to the condenser.

25. The combination unit of claim 24, wherein the refrigeration system is electronically controlled to operate in one of at least four modes including:

(a) a dual ice making and refrigeration mode in which water is supplied to the ice maker evaporator plate and refrigerant is supplied to the ice maker evaporator and the refrigerator evaporator;

(b) a refrigeration only mode in which refrigerant is supplied to the ice maker evaporator and the refrigerator evaporator without supplying water to the ice maker evaporator plate;

(c) an ice making only mode in which water is supplied to the ice maker evaporator plate and refrigerant is supplied to the ice maker evaporator and not to the refrigerator evaporator; and

(d) an ice harvest mode in which pre-condensed refrigerant is supplied to the ice maker evaporator.

26. The combination unit of claim 25, wherein the refrigeration system can be electronically controlled to operate in a fifth cleaning mode in which no refrigerant is supplied to either the ice maker evaporator or the refrigerator evaporator and water is supplied to the ice maker evaporator plate.

27. The combination unit of claim 24, further including a water system including:

a water sump mounted in the ice maker chamber beneath the ice maker evaporator plate;

5 a water pump disposed in the sump to circulate water from the sump back to the evaporator plate; and

an overflow mechanism coupling the sump to a drain.